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Energy Demands for Public Water Supply
NREL Stakeholder Technology Forum
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Who Are We?

- The Awwa Research Foundation (AwwaRF) is a member-supported, international, nonprofit organization that sponsors research to enable water utilities, public health agencies, and other professionals to provide safe and affordable drinking water to consumers.

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Our Mission:

Advancing the science of water to improve the quality of life.

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We Achieve Our Mission By:

- Sponsoring research
- Developing knowledge
- Promoting collaboration

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AwwaRF Research

- Total research value - > $340 million
- 2004 research value - $37 million
- > 800 research projects total
  - > 500 published reports
  - > 300 projects currently ongoing

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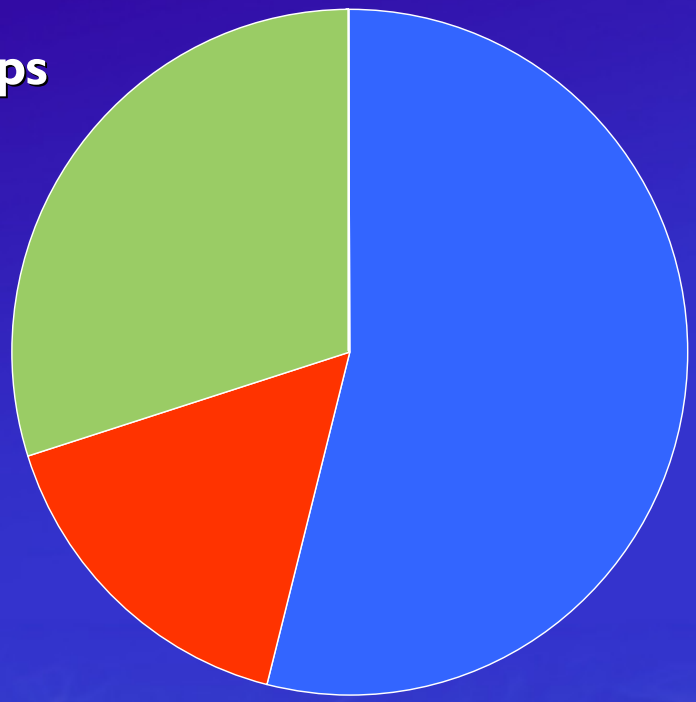
Sources of Funding



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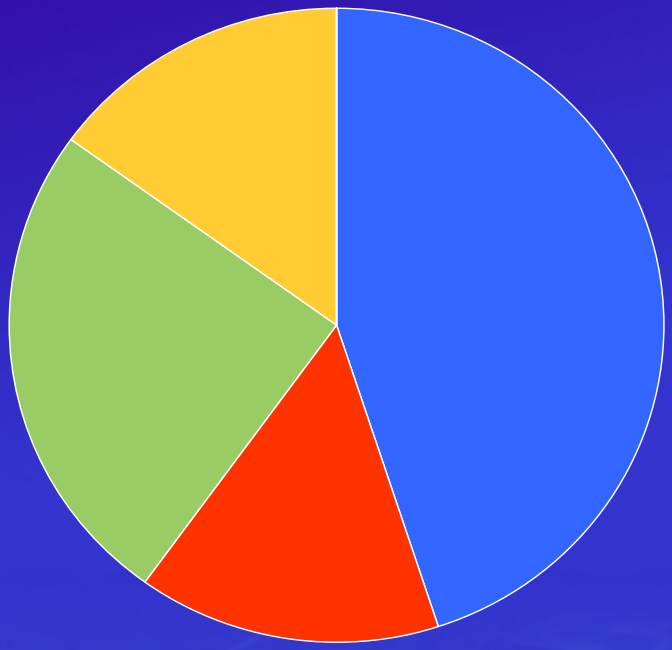
Where Funding Goes



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Strategic Goal Areas

- Efficient and Customer Responsive Organization
- Environmental Leadership
- High-Quality Water
- Infrastructure Reliability

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Current Topics of High Interest

- Emerging contaminants & treatment technologies
- Distribution system water quality
- Water reuse/desalination
- Energy management
- Infrastructure repair & replacement
- Asset management

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Published Energy Projects

- Ozone System Energy Optimization Handbook (AwwaRF 1996)
  - AwwaRF / EPRI funded
- Quality Energy Efficiency Retrofits for Water Systems (EPRI 1997)
  - AwwaRF / EPRI / CEC funded
- Energy and Water Quality Management System (AwwaRF 1997)
  - AwwaRF / EPRI funded
- A Total Energy and Water Quality Management System (EPRI 1999)
  - AwwaRF / EPRI funded
- Implementing a Prototype Energy and Water Quality Management System (AwwaRF 2003)
  - AwwaRF/CSU funded
- Best Practices for Energy Management (AwwaRF 2003)

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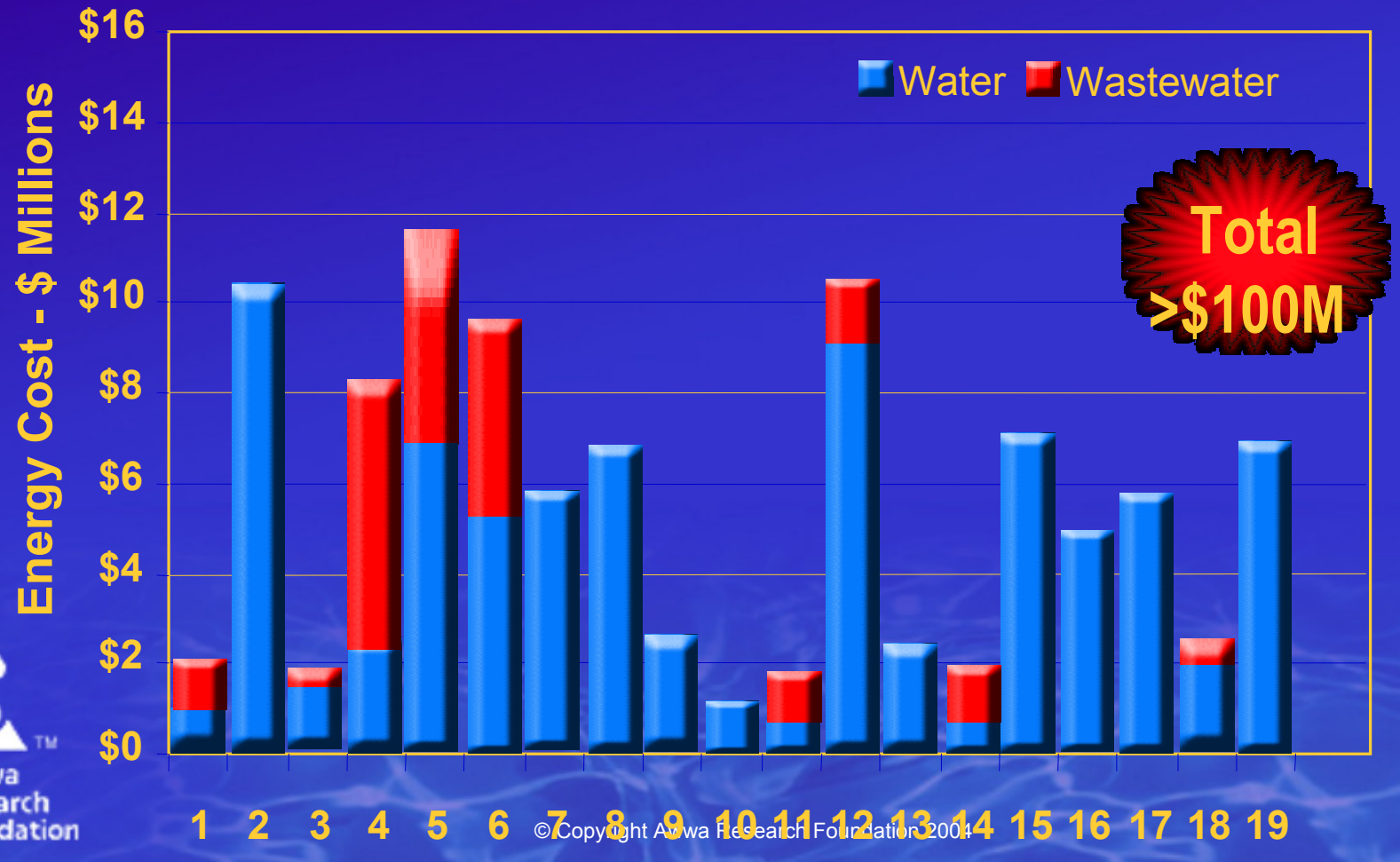
Best Practice Metric: Energy Costs For Participants



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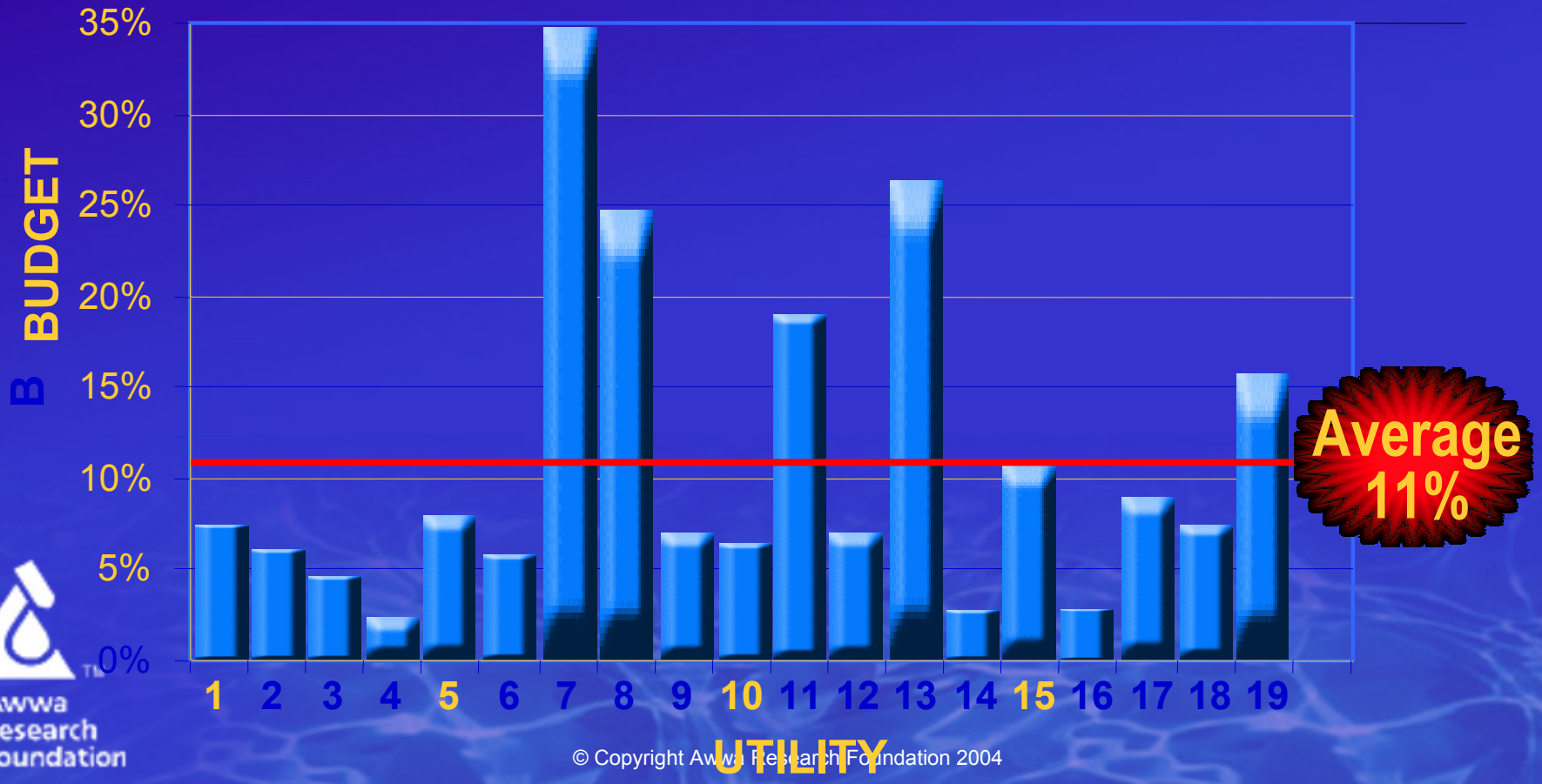
Best Practice Metric: Water Utility Energy Cost % of Operating Budget



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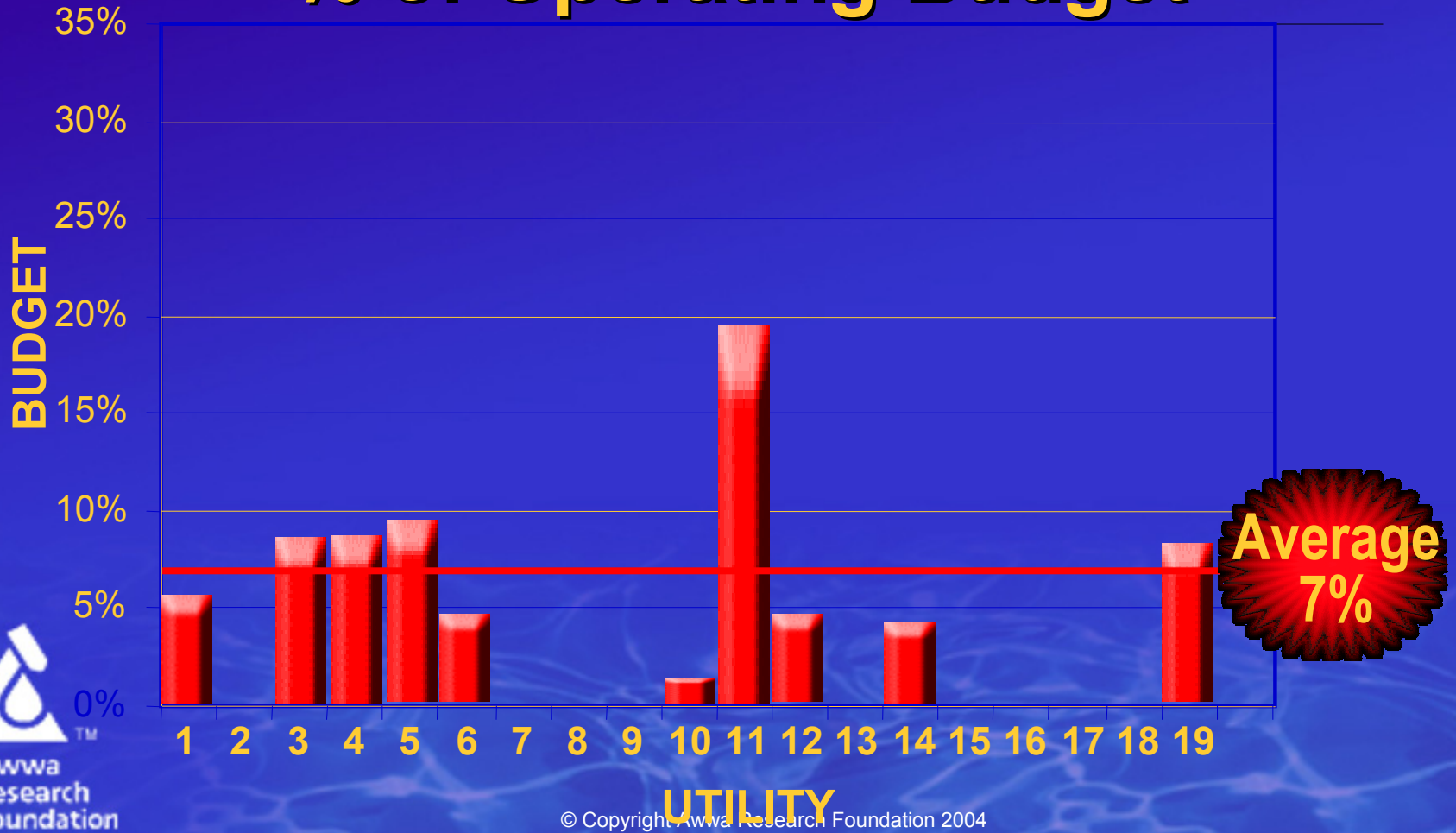
Best Practice Metric: Wastewater Utility Energy Cost % of Operating Budget



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Best Practice Key Findings

- Change energy supply and procurement practices
- Share and manage best practice methods and metrics
- Find and consistently track the best metrics for energy management improvement
- Form energy teams to allow for the development of consistent and effective energy saving action plans
- Monitor and analyze energy trends relative to costs and reliability

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CEC/AwwaRF Research Roadmap

- Advanced treatment processes
- Desalination
- Energy generation and recovery
- Societal and institutional issues
- Energy optimization
- Sustainability
- Decentralization
- Total energy management

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CEC/AwwaRF Funded Energy Projects

- Development of a Utility Energy Index to Assist in Benchmarking of Energy Management for Water and Wastewater Utilities (Project 3009)
- Zero Liquid Discharge and Volume Minimization for Inland Desalination (3010)
- Water Consumption Forecasting to Improve Energy Efficiency of Pumping Operations (3066)
- Assessing Risks and Benefits of Drinking Water Utility Energy Management Practices (3058)
- Evaluation of the Dynamic Energy Consumption of Advanced Water and Wastewater Treatment Technologies (3056)

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Futures Project: Top Trends for Water Utilities

- Population
- Political environment
- Regulations
- Customers
- Technology
- Increasing risk
- Finance
- Workforce
- Energy
- Total water management

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Energy Drivers

- Energy cost and supply reliability will become major issues for utilities.
- Electricity “deregulation” is in disarray and its future is uncertain.
- Gas prices are high and volatile due to increased demand.
- Local conditions vary significantly.

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Energy Implications

Implications for water utilities:

- Develop an energy plan for each utility
- Aggressive energy conservation needed
- Develop backup capabilities
- Consider energy cost pass through in rates

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Drivers for Water Utilities

- Optimize operations to reduce costs
- Conserve scarce water resources
- Treat source waters of marginal chemical and microbial quality
- Accountability to stakeholders
- Total water management for sustainability
- Always: Provide a safe and adequate supply of drinking water to customers

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Future Research?

- Optimize treatment processes
- Develop and optimize increasingly advanced treatment processes for marginal quality water supplies and newly discovered contaminants
- Develop collaboration opportunities & models to optimize limited water resources

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Thank You.

Questions?

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